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Unlocking the Potential of Vaccines Built on Messenger RNA

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Abstract

In recent years, immunotherapy has revolutionized the treatment of cancer; however, inflammatory reactions in healthy tissues often have side effects that can be serious and lead to permanent discontinuation of treatment. This toxicity is not yet well understood and is a major obstacle to the use of immunotherapy. When the immune system is so severely activated, the resulting inflammatory reaction can have detrimental effects and sometimes serious damage to healthy tissue. We wanted to know if there was a difference between an optimal immune response that aims to kill cancer and an unwanted response that could affect healthy tissue. Identifying the distinctive elements between these two immune responses allows the development of new, more effective and less toxic therapeutic approaches.

Keywords: Cancer; Cells; Tissues, Tumors; Prevention, Prognosis; Diagnosis; Imaging; Screening; Treatment; Management

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Introduction

In an immune-related toxic response, two types of immune cells (macrophage and neutrophil populations) appear to be responsible for attacking healthy tissue but not killing cancer cells. In contrast, another type of cell (a population of dendritic cells) does not play a role in attacking healthy tissue, but is essential for killing cancer cells. Immune therapies can produce specific proteins that threaten the immune system and trigger an inflammatory response. In tumors, these proteins are welcomed because they allow the body's immune system to kill cancer cells. The presence of these proteins in healthy tissue can lead to the destruction of healthy cells. The fact that these inflammatory proteins are produced by different cells in healthy tumors and tissues is an interesting finding. Dendritic cells are very rare, while macrophages and neutrophils are more common. Some macrophages are present in the embryonic developmental stages in most parts of our body and remain there throughout our lives. Contrary to popular belief, these

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macrophages do not necessarily inhibit inflammation, but when stimulated by immunotherapy, they can trigger a harmful inflammatory response in the healthy tissue of their habitat and explain why toxicity can affect different organs [1-510].

Results and Discussion

When macrophages are activated by drugs, they produce inflammatory proteins. These in turn activate neutrophils, which carry out a toxic reaction. Pitt says this makes it possible to limit the side effects of immunotherapy by manipulating neutrophils. The team confirmed the discovery by studying the immune responses of mice whose cellular activity was modulated using genetic tools. They were able to identify an opening that could be used to eliminate these side effects. In fact, neutrophils produce some factors for the development of toxicity, including TNF-α, which can be a therapeutic target. TNF-α inhibitors are currently used to modulate the immune response in people with osteoarthritis and may be useful in cancerous conditions to inhibit the toxic effects of neutrophils during immunotherapy; In addition, inhibiting neutrophils can be a more effective way to fight cancer; In addition to triggering a toxic response, some of these cells also stimulate tumor growth; So by controlling them we can have a doubly beneficial effect: overcoming the toxicity in healthy tissues and the growth of cancer cells.

Conclusions

Cancer cells eat themselves to survive. Cancer cell membranes are currently the focus of research showing a new way to save cancer cells. With this method, cancer cells can repair the damage that causes them to die. Damage to the cell membrane must be repaired quickly. Cancer cells use a method called macropinocytosis, which is now a well-known tool for cells in other tissues. In this procedure, a healthy cell membrane is pulled over the affected area and the hole is closed within minutes. Then, the damaged part of the cell membrane breaks down into small spheres and is transferred to the "lysosome" of the cells, which is like their stomach. One of the most dangerous features of cancer is that it spreads throughout the body. If tumors develop in new parts of the body, the disease becomes more difficult to treat and usually requires a wider range of treatments; especially when cancer cells spread to tissues in the body that are prone to membrane damage.

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Scattering (WAXS), Grazing-Incidence Small-Angle X-Ray Scattering (GISAXS), Grazing-Incidence Wide-Angle X-Ray Scattering (GIWAXS), Small-Angle Neutron Scattering (SANS), Grazing-Incidence Small-Angle Neutron Scattering (GISANS), X-Ray Diffraction (XRD), Powder X-Ray Diffraction (PXRD), Wide-Angle X-Ray Diffraction (WAXD), Grazing- Incidence X-Ray Diffraction (GIXD) and Energy-Dispersive X-Ray Diffraction (EDXRD) Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation. Glob Imaging Insights. 3: 1-10.

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and 2-Amino-9-((1S, 3R, 4S)-4-Hydroxy-3-(Hydroxymethyl)-2-Methylenecyclopentyl)-1H-Purin-6(9H)-One-Enhanced Precatalyst Preparation Stabilization and Initiation Nano Molecules. Glob Imaging Insights. 3: 1-9.
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